ELECTRONICS

EDUCATIONAL SPACES

Printing Instructions

1. Print the Table of Contents section to obtain an overview of the total document.
2. Print each document section that you are interested in.
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ELECTRONICS

GENERAL PROGRAM GOALS AND OBJECTIVES STATEMENT

- ☐ Electronic Technology is a program designed to prepare students with skills to assemble, install, operate, maintain, and repair electrical/electronic equipment used in industry and manufacturing. Includes instruction in the use of various types of equipment such as power supplies, televisions, video cassettes records, amplifiers, motors, controls, digital and computer circuitry, synchro and servomechanism, mechanical-power-transfer systems, pneumatics, hydraulic systems, and three-phase A.C., electronic wave-shaping, and control circuitry. The program also includes training in applied communications, and employability skills including leadership, human relations, and safe efficient work practices. Instruction at the secondary level requires a three year sequence of instruction with a least one multiple period block of instruction. All programs prepare students to take the National Standards developed test offered by CEMA and other appropriate industry based certification examinations.

PROGRAM ACTIVITIES

- ☐ Lectures
- ☐ Soldering
- ☐ Bread Boarding Circuits
- ☐ Measuring
- ☐ Calculating
- ☐ Computing

- ☐ Trouble Shooting
- ☐ Repairing (TV VCR, computers, peripherals)
- ☐ Construction/fabrication
- ☐ Using hand tools
- ☐ Small group problem solving
- ☐ Demonstrations
- ☐ Cabling
- ☐ Network Testing and Design
- ☐ Computer Aided Instruction
- ☐ Laser optics

AREAS

DESCRIPTION	EST. STAFF	EST. STUDENTS	SQ. FT. TOTAL
CAI Lab	1-2	15-20	1000-1500
Gen Lab		15-20	1000-1500
Offices	1-2		150
Tool Room		1	200
Storage			200
Restrooms			150
Mechanical Room			100-200

INTERNAL/EXTERNAL RELATIONSHIPS - WHAT SHOULD BE NEAR THIS AREA

- ☐ Offices need to be near the labs.
- ☐ The tool room should be near the general lab.
- ☐ Storage rooms and the labs should be contiguous.

- ☐ The electronics area may be located near the automotive and networking classes.
- ☐ Electronics may benefit from being near other professional-technical education classes.

UTILITIES

Plumbing:

- ☐ Plumbing should be positioned or dampened to minimize noise.
- ☐ A sink should be plumbed in the general lab.
- ☐ Plumbing for vacuum air should be provided in two areas in the general lab.
- ☐ Compressed air should be plumbed to two different areas of the general lab.
- ☐ Gas should also be plumbed to two different areas in the general lab.
- ☐ An emergency eye wash and shower should be considered in the general lab.

HVAC:

- ☐ The heating, ventilation, and air-conditioning system needs to be of sufficient size to keep each instructional space at a comfortable temperature.
- ☐ The system needs to have a fresh air exchange system to keep high air quality in each instructional space.

- ☐ The general classroom supply and exhaust ducts need to be positioned to minimize any draftiness in the room.
- ☐ The HVAC controls need to be designed to allow individuals the ability to modify the classroom temperature for the instructional requirements of the classroom activities.
- ☐ The controls need to be positioned so that the room temperature is not “misread” (e.g., not too close to a door, window, or vent).
- ☐ The general lab requires “cleaner” air and a high level filtering system.
- ☐ Additional ventilation when soldering needs to be available on demand.

Electrical:

- ☐ One four-plex should be provided at each perimeter CAI station with anti-static ground.
- ☐ Surge protection should be supplied at the panel.
- ☐ Electrical supply outlets need to be provided for any built-in audio-visual equipment installed in the classroom (e.g., television, VCR, electric ceiling screen, etc.) Controls for the screen should be by the light switches.
- ☐ Each classroom should have occupancy sensors installed for lights.
- ☐ Separate conduit to roof should be provided for one or more antennas.
- ☐ A quality grounding system will be needed for the antennae system.
- ☐ 220 volt and multi phase power needs to be provided at two areas of the perimeter stations. 208 volt/or 440 3 phase power may also be necessary in the lab.

- ☐ Power to the center worktables needs to be provided in floor trays with flush, metal plate covers.
- ☐ Additional four-plexes will be needed in the tool room for recharging.
- ☐ An emergency power master switch should be provided.

Lighting:

- ☐ Lighting needs to be even across the general lab with task lighting at the workbenches.
- ☐ The lighting controls need to accommodate an instructor's need to vary the light intensity for different instructional tasks.
- ☐ The light fixtures need to be energy efficient to keep operating costs at a minimum.

Technology:

- ☐ Data drops should be provided at the following:

  Each peripheral station (1-2)

  Office (1-2)

  Tool room (1-2)

  Ceiling projector (1)

  Smart Board (1)

  Center work tables in the general lab (24 through the floor tray)

  Demonstration table (1)
- ☐ Each classroom needs to have access to cable TV for commercial, satellite and closed circuit broadcasts over the cable.
- ☐ Phone jacks should be placed near the door to the classroom and near the teacher's area.
- ☐ The phone system should be programmed to enable outgoing calls

directly from the classroom and lab, but incoming calls allowed only after going through the main office switchboard.

- ☐ Each classroom should be equipped with an integrated clock, intercom, and bell system.
- ☐ Each classroom should be equipped with a TV, VCR, electric screen and LCD/overhead projector.
- ☐ The area should be wired with data cable to enable the connection of a local area network and a wide area network

SURFACES

Floors:

- ☐ Vinyl composition tile on all floors
- ☐ If a CAI lab is a separate space, it should be carpeted.
- ☐ Consider a walking deck on the roof to the antennae.

Walls:

- ☐ A 4'x16' white board with friction clips needs to be provided.
- ☐ Wall and ceiling surface materials need to accommodate the acoustical needs of the classroom.
- ☐ Walls need to have a washable surface.
- ☐ Windows need to be of double pane glass and have operable integral blinds where practical.
- ☐ Interior windows are needed between the office and the labs.
- ☐ High windows should be considered for natural light where possible.

Ceilings:

- ☐ The ceiling height of this space should be 8' to 10'.
- ☐ The ceiling should be a durable suspended ceiling with acoustical tile.

Doors:

- ☐ The general lab should have a double door to the hallway.
- ☐ The general lab should have a Dutch door in the tool room.

STORAGE

- ☐ The general lab should contain areas for student storage.
- ☐ Floor to ceiling cabinets and adjustable shelves should be provided in the tool room. Some of these cabinets should be secure.
- ☐ A chemical storage cabinet needs to be provided in the storage room.
- ☐ Peripheral base cabinets should have counter tops with knee spaces underneath to act as desks for computer stations.
- ☐ The peripheral computer area needs to have overhead shelving for equipment storage and possible cabinet storage over the shelves.
- ☐ Cabinet storage under the work tables should be provided.
- ☐ The lab needs to have some locking cabinets specifically for the personal effects of the instructors.
- ☐ Space is needed for two (2) four-drawer, letter-size file cabinets in the office.
- ☐ The office cabinets should have counter tops with knee spaces underneath for computers and overhead cabinets for storage. Some of this storage should be secure.

FURNITURE AND EQUIPMENT

- ☐ A dryer and filter regulator for the compressed air is needed in the general lab.
- ☐ Each work station will need:

  DC and AC Power supply

  Function generator

  Oscilloscope

  Digital Volt/ohm meter

  Soldering stations
- ☐ Drill Press
- ☐ Programmable Controllers
- ☐ Electro/Hydraulic & Electro/Pneumatic interface & controls
- ☐ Motor control systems
- ☐ Miscellaneous Trainers of various sizes
- ☐ The general lab needs a TV/ VCR, overhead/LCD projector, and electric ceiling mounted screen.

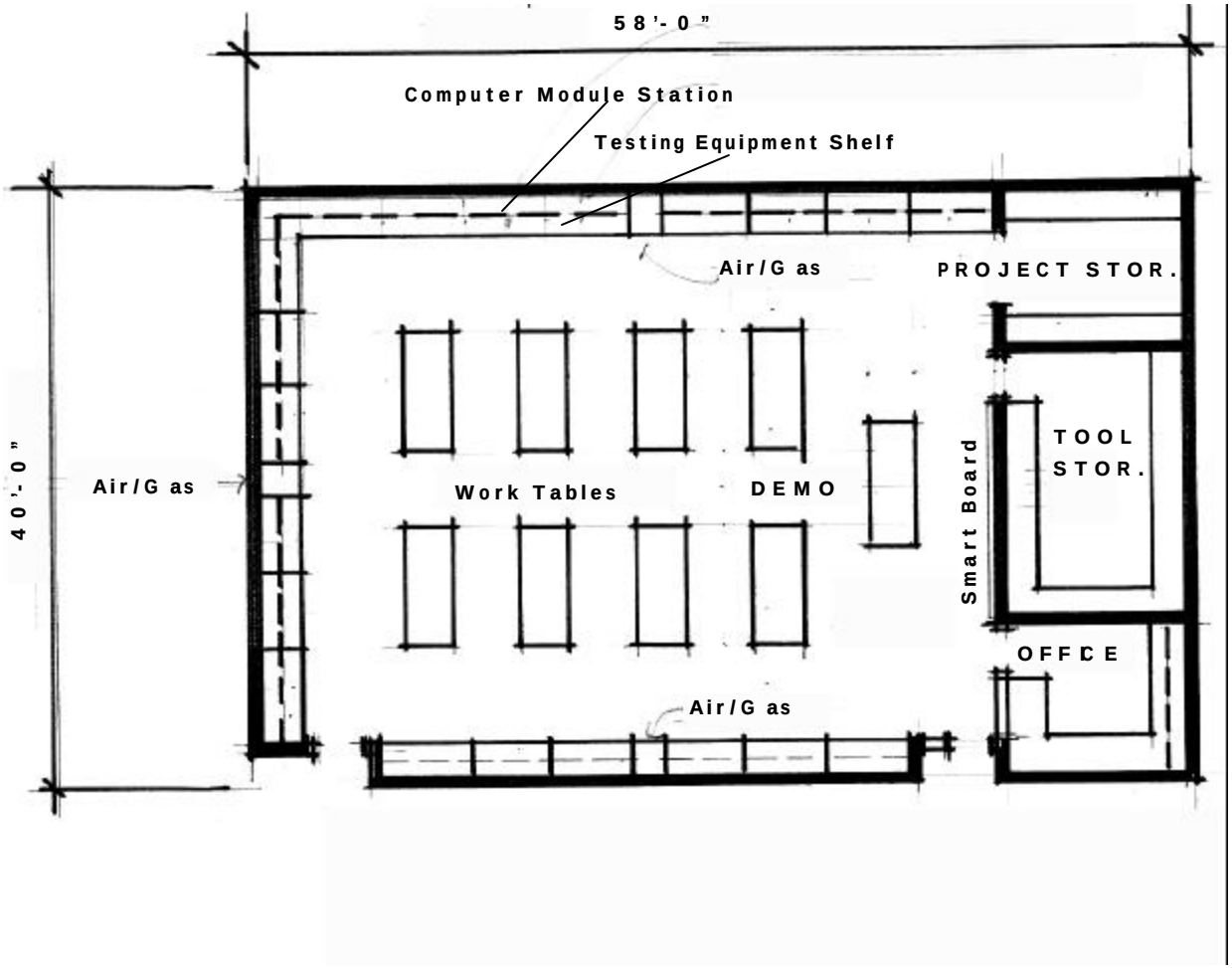
SAFETY ISSUES

- ☐ A safety kit should be provided in this area.
- ☐ Electrical emergency rescue tools
- ☐ All furniture should be ergonomically correct.

IMPORTANT NOTE

The following graphics are intended to show typical spaces and spacial relationships. They are not intended to serve as architectural drawings and are not adapted to specific sites.

These graphics should be used as a starting place for discussions with district personnel, planners, architects and engineers. Almost certainly, changes and adaptations will be required to meet the particular needs of the educational institution and the programs they offer.



ELECTRONICS LAB

The Matrix Group

Not to Scale